



Approved for Public Release;
distribution is unlimited

Lasers For Force Protection

Chuck Perkins
Assistant Deputy Under Secretary of Defense
for
Full Dimensional Protection

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 01-01-1998		2. REPORT TYPE Conference Proceedings		3. DATES COVERED (FROM - TO) xx-xx-1998 to xx-xx-1998	
4. TITLE AND SUBTITLE Lasers For Force Protection Unclassified				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Perkins, Chuck ;				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME AND ADDRESS Under Secretary of Defense Washington, DCxxxxx				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME AND ADDRESS Director, CECOM RDEC Night Vision and Electronic Sensors Directorate, Security Team 10221 Burbeck Rd. Ft. Belvoir, VA22060-5806				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT A PUBLIC RELEASE					
13. SUPPLEMENTARY NOTES See Also ADM201041, 1998 IRIS Proceedings on CD-ROM.					
14. ABSTRACT ? Countering Weapons of Mass Destruction ? Countering Air and Missile Threats ? Countering Terrorism ? Combat Identification					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19. NAME OF RESPONSIBLE PERSON	
		Public Release	12	Fenster, Lynn lfenster@dtic.mil	
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified		19b. TELEPHONE NUMBER International Area Code Area Code Telephone Number 703767-9007 DSN 427-9007	
				Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std Z39.18	



The Big Protection Issues

- **Countering Weapons of Mass Destruction**
- **Countering Air and Missile Threats**
- **Countering Terrorism**
- **Combat Identification**



Elements Of Full Dimensional Protection

Ref: Concept for Future Joint Operations May 1997

1. Control of the battlespace

1.1 **Protect from a full range of threats**

- 1.1.1 Attacks where we are vulnerable
- 1.1.2 Attacks in our rear areas
- 1.1.3 Disruption of strategic Comm
- 1.1.4 Attacks on Host Nation Support
- 1.1.5 Coercion of partners
- 1.1.6 Terrorist attacks

2. Information Superiority

2.1 **See the battlespace**

2.2 **Discriminate friend and foe**

2.3 **Anticipate and control enemy action**

2.4 **Disseminate threat Information**

2.5 **Protect Information systems**

2.6 **Deny adversary information systems**

3. Multilayered Protection

3.1 **Broad range of threats**

3.2 **Full range of offensive and defensive actions**

3.2.1 Joint counter air & missile

3.2.2 Information Operations

3.2.3 Manned and Unmanned Platforms

3.2.4 Sensor grid

3.3 **Passive protection**

3.3.1 Awareness of threat

3.3.2 Enhance Deception and Camouflage

3.3.3 Increased personal protection

3.3.4 Dispersed operations

3.3.5 Improved electronic countermeasures

3.3.6 Joint restoration from WMD

3.3.7 New sensors to detect WMD

3.4 **Offensive and Defensive actions**

3.4.1 Active and passive protection

3.4.2 ID and track friendly vulnerabilities

3.4.3 Discriminate friend and foe

3.4.4 Safety and health initiatives



Advantages of LASERS

- **Power**
- **Speed of Light**
- **Coherence**
- **Short Wavelength**
 - LWIR to X-RAY
- **Wavelength Selectability**
- **Modulation Options**
 - Time Domain, Frequency Domain, Phase, Polarization
 - High Bandwidth
- **Detector Options**
 - Imaging, Modulation Specific
- **Compact**



Example Applications Weapons

- Theater High Energy Laser (THEL)
- Airborne Laser

X Power	
X Speed of Light	
Coherence	
Short Wavelength	
Wavelength Selectability	
Modulation Options	
High Bandwidth	
Detector Options	
Compact	



Example Applications Sensors for Counter WMD

- Detect Gas, Aerosol or Particulate Clouds
- Identify Chemicals or Biologicals

	Power
	Speed of Light
	Coherence
X	Short Wavelength
X	Wavelength Selectability
X	Modulation Options
X	High Bandwidth
X	Detector Options
X	Compact



Example Applications

Combat ID

•Precision Targeting Identification (PTI)

	Power
	Speed of Light
X	Coherence
	Short Wavelength
	Wavelength Selectability
X	Modulation Options
X	High Bandwidth
X	Detector Options
X	Compact



Lasers In ACTDs

(ACTD Web Site www.acq.osd.mil/at)

-
- **Theater High Energy LASER (THEL ACTD)**
 - Destroy Katyusha Style Rockets
 - **Precision Targeting Identification (PTI ACTD)**
 - Micro Doppler Signatures
 - Precision Track
 - **Unattended Ground Sensors (UGS ACTD)**
 - Ceilometer to Measure Cloud Height
 - **Rapid Force Protection Initiative (RFPI ACTD)**
 - Forward Observer/Forward Air Control (FO/FAC)
 - Hunter Sensor Suite (Range Measurement)
 - Remote Sentry (Range Measurement)
 - **Military Operations in Urban Terrain (MOUT ACTD)**
 - Forward Observer/Forward Air Control (FO/FAC)



Precision Targeting Identification (PTI)

FY98 ACTD

MISSION:

- Detect, Track, Identify Non-Cooperative Air, Land and Sea Targets
- Demonstrate Capability Aboard JIATFE Counter Drug P-3 aircraft

PERFORMANCE Requirement:

- Detect, Track, and ID
 - Aircraft to 35 NM, Ships to 30 NM, Ground Targets to 12 NM Passively
- Day/night Operations Vs. Small, Fast, Non-Metallic Hulled Vessels

TECHNOLOGIES:

- 3RD Gen MWIR Staring FLIR with a 4X Increase in Range
- Navy Developed Stand Off Electro-optical System
- Infrared LADAR system
 - Precise 3D Track
- Non-Cooperative Target Identification (Vibration Signature Analysis)
- Developed under Navy Combat ID Sponsored 6.3 Program
- Shipboard and Airborne Sensor Packages Developed Under
USN Radiant Mist and Outlaw Programs



Unattended Ground Sensor

FY 98 ACTD

- **Unattended MASINT Sensors**
 - Find and Identify Time Critical Targets
- **Remote Miniature Weather Station (RMWS)**
 - USSOCOM Requirement
 - Local “NOW” Weather (Temperature, Wind, Visibility, etc)
 - Ceiling Height Requirements
 - » +/- 10 ft below 1500 ft and +/-100 ft above to 12000ft
 - » Air Deployable (3000Gs impact)
 - » All Weather operation
 - » Satellite Readout
 - Ceilometer Design
 - » LASER Trans: 16mm Aperture, 20mJ-5ns Pulses, 1.06 μ m Freq
 - » Laser Receiver: 50 mm Aperture
 - » Total System weight 14 lb.



Some Needs

- **See Through Obscurants: Fog, Smoke**
 - Range Gating
- **Recognize Man Made Objects**
 - Polarization
- **Identify Objects**
 - Range Profiles, Other
- **Auto Land in Category 3 Weather and Obscurants**
 - Forward Scatter
- **Penetrate Foliage and Camouflage**
 - Exploit Multiple Small Openings
- **See and Communicate Inside of Buildings**
 - ?
- **Sterilize Chemicals or Biologicals**
 - Speculative !



Some Requirements

- **Cost Effective**
 - 80% solutions
- **Safe**
- **Rugged**
- **Minimal Skills Required for Operation**
- **Maintainable**
- **If Man Portable**
 - Small
 - Simple
 - Light Weight
 - Low Power Needs
 - Low Signature